ABSTRACT

In order to adjust thickness of a bonded silicon single crystal film 15 depending of thickness of an SOI layer 5 to be obtained, depth of formation d1+tx of a separatory ion implanted layer 4, measured from a first main surface J, in the separatory ion implanted layer formation step is adjusted through energy of the ion implantation. Dose of the ion implantation is set smaller as the depth of formation measured from the first main surface J becomes smaller. A smaller dose results in a smaller surface roughness of the separation surface, and makes it possible to reduce polishing stock removal of the separation surface of the bonded silicon single crystal film in the planarization step. Uniformity in the thickness of the SOI layer can consequently be improved even for the case where a thin SOI layer has to be formed. The present invention is therefore successful in providing a method of fabricating an SOI wafer capable of suppressing variations in the intra-wafer and inter-wafer uniformity of the thickness of the SOI layer to a sufficiently low level, even for the case where a required level of the thickness of the SOI layer is extremely small.